TECHNOLOGY DEPT.

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OCTOBER 1, 1949

SCIENCE NEWS LETTER

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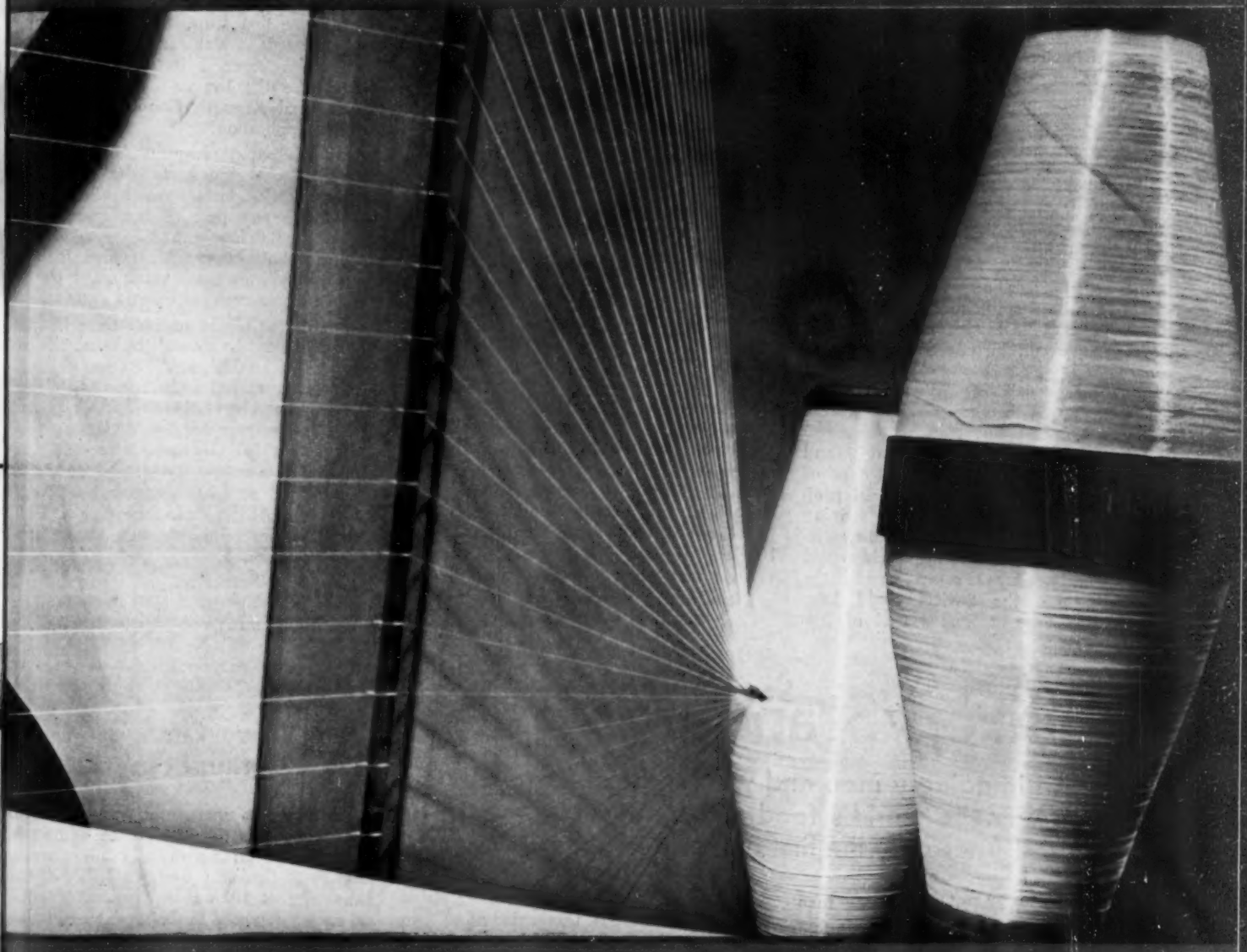
THE WEEKLY SUMMARY OF CURRENT SCIENCE



Fiber of the Future

See Page 218

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BIOLOGY

Trials of Germ Warfare

It would be difficult for the Russians to keep secret trials of any biological warfare weapons because large groups of people would be involved.

➤ THE other great secret weapon besides the atom bomb is biological, or germ, warfare. BW, the scientists call it for short. The subject is even more hush-hush than atomic energy. Scientific and military opinion, so far as anyone has dared to give one publicly, is divided on whether BW is more or less to be feared than atomic warfare.

The production of BW weapons might be kept secret, so far as cultivating the germs or their poisons is concerned. The laboratories might be given the innocent appearance of a plant producing vaccines for peacetime protection of the population against smallpox, diphtheria, and so on. Apparatus such as cloud chambers for testing methods of spreading the germs might be a little harder to conceal or disguise.

But actual trials of any BW weapon would be a hard secret to keep. And until BW is used in war its practical value, whether it would be effective, cannot be proved.

Any secret trials of BW would have to be made on people—not just a few human volunteers but men, women and children going about their work and play, or on an encampment of troops or of workers on some large industrial project. If effective, news of illness striking like an epidemic, even in a remote, relatively undeveloped area of the world would leak out fairly soon. Of course, there is the possibility that the Soviets could keep secret for a time at least a trial of BW on prisoners in some closely guarded camp in Siberia.

The bottleneck problem in BW is the large-scale spread of disease germs through the air. Pollution of water supplies, of food in industrial plant cafeterias and of the air in theaters or other public buildings could be accomplished but would be minor BW offensives, coming under the head of sabotage.

What germs might be used for BW is probably one of the most closely guarded secrets of this or any nation. Botulinus toxin, so deadly a poison that an ounce could kill 200,000,000 humans, and tetanus toxin, a close second as a killer, can probably be discounted. We have these poisons, but they are not practical for BW use because of the difficulty of getting them into enough people.

More effective for BW purposes would be a germ like the parrot fever virus. The value of such germs would come from the fact that the diseases they cause propagate themselves. The parrot fever virus grows and multiplies in the infected person.

Best argument against the use of BW, of course, is the danger of backfire. Once a good epidemic is started any place in the world, it is extremely difficult to stop it. Germs do not recognize international barriers, as has often been pointed out, nor do they know the difference between a friendly and an enemy uniform.

Science News Letter, October 1, 1949

NUTRITION

Well-Fed Standards Set

An imaginary man and woman have been created to reign over the world's food requirements, which have been raised. These are the first universal standards.

➤ MEET "Mr. Well-Fed." A young man of medium stature and middling weight, who will be the world's calorie arbiter, was created by a panel of nutrition experts in Washington.

"Mr. Well-Fed", as he might be called, is imaginary, a composite figment, but with his female counterpart, he will lord it over the world of food in much the same way the standard inch and the standard meter rule the world of measurement.

He will eat better than any previous "reference man", reflecting the more stable peacetime conditions that exist now than during or right after the war. His food need is set at 3,200 calories per day.

He is 25 years of age, weighs about 144 pounds and works at an active though not constantly strenuous job. He might be a dairy farmer, a truck driver or a laboratory worker who walks around a lot.

"Mrs. Well-Fed" is also 25 years old. She weighs 122 pounds. She might be a housewife taking care of a couple of active young children. Or she might be a light industrial worker. Her allotment of calories is 2,300 a day.

This hypothetical couple live in a temperate climate, such as might be found in England or Indiana. Their creators are a committee of international nutrition experts who were summoned together by the Food and Agriculture Organization. Their job was to set up accurate food requirements for the different regions of the world.

The committee's work, including the construction of this average couple as a world food yardstick, will be published in the near future. The deliberations were hailed by FAO officials as a major stride forward in properly feeding the world. This is the first time, they pointed out, that standards which are universal the world over have been reached. Prior studies, like the League of Nation's and the National Research Council's had only regional application.

Although the committee's reference "couple" are designed for the temperate zone, conversion factors which will fit the standard to any part of the globe have been drafted. These conversions take into account a host of variable factors including climate, individual variation, type of work and play engaged in, and altitude.

Some notion of the advance these figures represent may be found by comparison with earlier estimates. The new calorie figure for a man is 3,200 per day, 2,300 for a woman. The National Research Council has in the past suggested 3,000 as adequate for a grown man. The FAO in 1946 had set a temporary satisfactory maintenance level at 2,200 for men and 1,800 for women. At the same time they had set a rock bottom minimum subsistence level at 1,900 calories.

The new figures of 3,200 and 2,300 calories per day for the reference couple represent a nutritional gain throughout the world.

Science News Letter, October 1, 1949

PHYSIOLOGY

Brain Wave Changes Noted During Pain

➤ PAIN shows up in brain wave records. It registers as a decrease in the amplitude of the electrical waves of brain activity, Drs. F. B. Benjamin and A. C. Ivy of the University of Illinois department of clinical science reported to the American Physiological Society in Augusta, Ga.

Unfortunately, the pain change in brain waves is not specific. Cold, heat and touch cause the same change in brain waves. And the pain change does not depend on the nature and degree of pains. Brain wave records, therefore, cannot be used as was hoped to determine the severity and nature of the pain a patient says he has.

Science News Letter, October 1, 1949

NUCLEAR PHYSICS

Spotting Soviet A-Bomb

Discovery of the Russian atom bomb burst may have come from cosmic ray studies by American scientists. Bomb fission fragments in the atmosphere would be a give-away.

President Truman announced on Sept. 23: "We have evidence that within recent weeks an atomic explosion occurred in the U.S.S.R.

"Ever since atomic energy was first released by man, the eventual development of this new force by other nations was to be expected. This probability has always been taken into account by us."

There was no official explanation of how the explosion was detected.

➤ CLINCHING proof of Russia's atomic bomb activities could have come from cosmic ray studies by American scientists who have been keeping a careful watch this summer on all radioactivity in the upper atmosphere.

Their studies would show, as no spy could, whether the Soviets were trying to start a false "scare" rumor.

The existence of bomb fission fragments in the atmosphere could not be faked. Such fission fragments would be viciously "hot" strange atoms, radiating furiously, and of a kind never found in nature outside of a bomb or atomic pile. And these fragments could have been detected by cosmic ray scientists.

Here is how it might have been done:

The first indication to a cosmic ray scientist of an atomic explosion in Siberia would be an apparent increase in the number of cosmic ray particles coming in from outer space. In California or Oregon, the increased cosmic ray intensity would be noticed on instruments for a day or two before it subsided. At just about that time the increase would first be noticed in the Midwest, in the balloon flights by the Minnesota observers at Fort Ripley, Minn., or in observations by the Chicago group.

Jump in Cosmic Rays

In Climax, Colo., on the mountain-top observatory where both cosmic ray intensity and sunspot activity are continuously studied, the scientists would simultaneously note the jump in cosmic rays—and without the usual sunspot configuration. Their suspicions might be aroused.

Then, three or four days after hitting the California coast, cosmic ray instruments at Columbia, Princeton and Harvard would kick up all together, and just a little too much for the scientists to believe that it was the usual course of events.

Suspicions aroused, the check-up would begin. The scientists would soon realize that it was not a cosmic ray burst, which would have hit all the stations simultaneously, and with an accompanying solar flare or sunspot. They would guess that there must be an airborne radioactive contaminant, highly dispersed, that was blowing along with the western prevailing winds clear across the continent.

The routine reports that would at this point arrive from the Peruvian cosmic ray observatory at Huancayo, high in the Andes, would show no cosmic ray increase on or about the dates of the rise in California.

Christchurch, New Zealand, would fail to report any change in their readings. A radio query to the Danish cosmic ray observatory in Godhavn, Greenland, would bring the report of an insignificant wriggle in the record, but which was over a week after the marked increase had been found in California.

Scientists would now be sure there must be a radioactive contaminant in the air, but which was confined to the northern hemisphere of the globe, and which was slowly blowing along in the steady western flow of the atmosphere.

All doubts would disappear when the balloon flight photographic plates showed an enormous increase in the number of low-energy alpha particles—particles thrown out in profusion from the sizzling fission products of uranium, but which are much rarer in cosmic radiation. The first reports of this might have come from the Minnesota group. Immediate confirmation of the Minnesota reports would come from the University of Rochester team, followed quickly by the University of Denver group.

Cosmic rays could not be the cause, that would be definite. Still to be excluded would be the bare possibility of natural radioactive dust blown from some desert perhaps. The Colorado plateau sands are the United State's major source of uranium.

Was it a Russian atomic explosion in Siberia, or was it a natural freak of the winds? Pollen and dust samples, filtered from the air by high-flying airplanes on the dates of the "cosmic ray bursts" would be dug up out of the files. Chemical tests, radiation "sniffers," Geiger counters, spectrographic tests, and mass spectrograms would be run. Strange products, found in such proportions only in bomb products, such as yttrium, neodymium, strontium and krypton might be discovered instead of the usual earth elements of calcium, silicon and iron. There could be no doubt now. The test results could mean only that an unreported atomic explosion had occurred somewhere in the world.

Whether it was a uranium or plutonium bomb would be found from the proportions of the different elements found in the air.

What could not be known—not unless the Russians tell us—is whether it was a real "bomb" or a fizzled experiment in nuclear energy which blew up a laboratory releasing the radioactive fragments to blow around the world.

Instrument Detection

There are two possibile instrumental methods of detecting atomic explosions, additional to the radioactive clouds of debris considered the most likely way.

Earthquake-like waves are started by any large explosion, but natural seismic disturbances are immensely greater than an atomic explosion. The first atomic bomb at Alamagordo in 1945 was detected on seismographs nearby but not on instruments more than 300 miles away. Three world-shaking earthquakes whose origins were near Russia were recorded in July but scientists are sure that they had nothing to do with the Soviet explosion. These were: July 4 in the Persian Gulf region, July 10 in eastern Turkistan, July 23 near west coast of Turkey.

A pressure-wave in the air is set up by a gigantic explosion and might be detected by a sensitive barograph. The great meteorite fall in Siberia in 1908 was detected on a microbarograph in England but this immense missile from outer space released more energy than a hundred atom bombs. (*See SNL*, Oct. 25, 1947; Nov. 22, 1947)

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***METAL-ETCHING METHOD—** Metal is placed in a partial vacuum containing argon gas, and then the gas is charged with 12,000 volts of electricity creating argon ions which bombard the metal's surface. Thus the physical features of metal can be examined under a microscope and its performance under certain conditions predicted. This is a development of the Ford Motor Co.*

CHEMISTRY

Better Synthetic Rubbers

➤ BETTER synthetic rubbers for industry were made known to the American Chemical Society meeting in Atlantic City, N. J.

Withstanding dry heat up to 400 degrees Fahrenheit and at the same time resistant to oil, gasoline and sunlight deterioration, a new polyacrylic and hydrocarbon synthetic called Hycar PA was reported by H. P. Owen of B. F. Goodrich Chemical Co., Cleveland.

The new Goodrich rubber will be used for hose, protective coatings on glass and asbestos, insulation on wire, conveyor belts and particularly where light or pastel colored products requiring color permanence are needed. White goods made from this rubber will not discolor in the sunlight.

New Neoprene Rubber

A new kind of neoprene rubber which will not deform materially under the weight of vibrating machines was announced by D. B. Forman, L. R. Mayo and R. R. Radcliff of Du Pont's Organic Chemicals Department. It will have particular application in mounting motors where the rubber vibration dampener is subjected to heat and oil which neoprene resists.

A new method of increasing the sunlight resistance of neoprene rubbers was reported by D. C. Thompson and N. L. Catton of the same company. The weather resistance of colored neoprene products is increased by use of compounding materials that are clays although other additions to the rubber do decrease weather resistance.

Science News Letter, October 1, 1949

BIOCHEMISTRY

Beryllium Poisoning Aid

➤ AN ANTIDOTE or treatment for beryllium poisoning may be on the way, thanks to researches by scientists at the University of Chicago Toxicity Laboratory.

Beryllium, used in making fluorescent lights and in many other industrial processes, poisons by interfering with the body's use of sugars and starches, these scientists, Drs. Kenneth P. DuBois, John Doull and Kenneth W. Cochran, announced at the meeting of the American Chemical Society in Atlantic City, N. J.

When beryllium dust is breathed into the lungs, or when the metal gets into the body in other ways, it competes with the calcium and magnesium from food. Both calcium and magnesium are needed for the breakdown of sugars and starches to give energy. Beryllium apparently can combine with the same compounds in the cell that calcium and magnesium can combine with, but it cannot perform the vital functions of these metals. When it takes their place it therefore blocks the sequence of normal chemical events in the body cells.

The results show up in the serious lung damage which is one form of beryllium poisoning or in bone cancer, rickets and a general failure of metabolism.

The Chicago toxicologists did not report a treatment for beryllium poisoning, but Dr. DuBois said:

"After the mechanism of action of a toxic substance is understood, then attempts to treat the condition can be undertaken in a scientific manner. Fundamental research on the chemistry of beryllium poisoning may lead to the development of an effective means of therapy (treatment)."

The highly valuable properties of beryllium alloys, particularly the copper-beryllium alloys, have greatly increased the metal's industrial importance in recent years.

The chances for exposure to beryllium dusts, Dr. DuBois said, are fairly numerous in industry and may be encountered during virtually all stages of beryllium production.

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CHEMISTRY-NUTRITION

Mass Output of Protein

A method for cheaper production on a mass scale of protein food substances for vein feeding has been announced. It will be made available to commercial producers.

➤ LIFE-ESSENTIAL protein food substances for vein feeding of stomach cancer patients and others too sick to eat can now be made at low cost by a simple method suitable for mass scale production.

The new method, expected to have a revolutionary impact on present production methods, was announced by Dr. Jesse P. Greenstein of the U. S. National Cancer Institute at the meeting of the American Chemical Society in Atlantic City.

As an example of the price saving possible by the new method, Dr. Greenstein said that one of the essential food substances, an amino called L-methionine, can be produced at a cost of 30 cents for a quantity now costing $6.50. This quantity, representing one-thirtieth of an ounce, is about all any manufacturing company now sells at one time, and the human body needs several times that much every day.

All eight of the essential amino acids can be produced by the new method at similar savings in money. The method is so simple that production by the pound can be achieved by an average technician.

Each of the essential amino acids, as synthesized in the laboratory, includes two closely similar types which are mirror images of each other. They are called L-type, or isomer, and D-isomer. Only the L-amino acids can be safely injected into the blood stream. But commercial production methods so far have not been able to supply anything like enough even at high cost of the L-amino acids needed by cancer and other patients.

In the method developed by Dr. Greenstein and associates, L- and D-amino acids, obtained cheaply in compound form, are digested in concentrated preparations of animal kidney, liver and pancreas. They are then purified by a series of simple chemical means. The technique will be made available to commercial producers.

Associated with Dr. Greenstein in developing the new method were: Drs. Vincent E. Price, Paul J. Fodor, James B. Gilbert, Alton Meister and Carl Baker, all of the National Cancer Institute.

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PSYCHOLOGY

Attitude Affects Success In Use of Artificial Leg

➤ DOCTORS can predict how well a veteran will get along with an artificial leg on the basis of the amputated man's attitude toward himself, Dr. Sidney Fishman, of the Veterans Administration's Prosthetic Testing and Development Laboratory, New York City, told the meeting of the American Psychological Association in Denver, Colo.

A board of three psychologists interviewed 48 men who had lost one leg, cut off above the knee, and gave them tests which would measure their opinions of themselves. On this basis, a judgment was made of how well they would adjust to the use of an artificial leg.

The judgment was then compared with photographs of the gait of the man with his artificial leg and with questionnaires filled out by the men and by their employers.

More amputated men take a dim view of themselves than are confident, it was found. And this sort of negative attitude causes difficulty in the use of the leg.

Predictions worked out all right, but were more effective when the man's attitudes were consistently either positive or negative.

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ENGINEERING

Giant Windtunnel Designed To Aid Supersonic Flight

➤ DETAILS of a new giant windtunnel for studying supersonic flight at the Langley laboratory, Langley Field, Va., of the National Advisory Committee for Aeronautics, are now released. The "secret" four-foot by four-foot tunnel has been in preliminary operation for the past year.

The new facility at the Langley laboratory is designed for the study of certain aspects of flights at speeds faster than the speed of sound, some 760 miles per hour. Because of its size, it permits the use of test models large enough to hold instruments. A 32-inch span model of a complete supersonic airplane now under investigation is fitted with movable controls and more than 300 pressure orifices.

A key element of the new tunnel is a specially designed air compressor of the axial-flow type which generates a flow of 870,000 cubic feet of air a minute. It was designed and constructed by Allis-Chalmers, Milwaukee, in conjunction with NACA Langley engineers.

This compressor is a seven-stage affair, is 11 feet in diameter, and has 1,137 blades. It requires 60,000 horsepower to drive it. It circulates air through the test section of the tunnel at velocities ranging from 1.2 to 2.2 times the speed of sound.

Operating velocities in the tunnel's test section can be varied by adjusting the flexible 25-foot-long walls of the nozzle ahead of the section. By means of gates, the test section can be isolated to permit model changes without returning the entire tunnel to atmospheric pressure.

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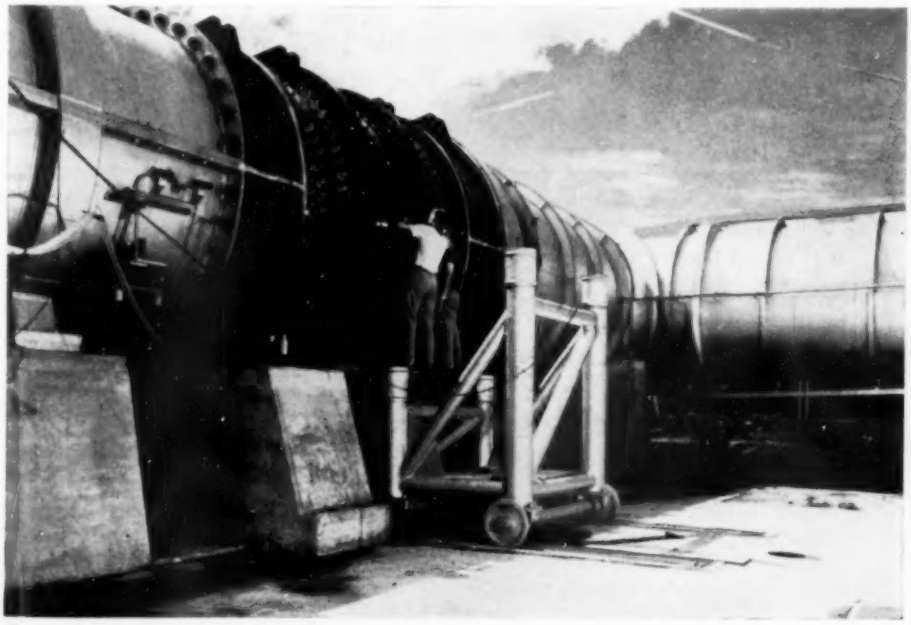

NEW SUPERSONIC TUNNEL—Most important single element of the huge tunnel is this 870,000 cfm axial flow compressor.

CHEMISTRY

New Washable Paint

This odorless paint is made up of water and synthetic rubber. The water evaporates leaving a thin sheet of rubber clinging to the wall which sheds dirt easily when washed.

➤ A NEW kind of odorless paint made of water and synthetic rubber looks like milk and spreads on walls like butter. It protects cement and plaster better than ordinary oil paints.

The American Chemical Society meeting in Atlantic City, N. J., heard L. L. Ryden, N. G. Britt and R. D. Visger of Dow Chemical Company, Midland, Mich., predict that this washable rubbery film will be used to coat interior and exterior walls of future houses.

The rubber used in the new paint is an emulsion of butadiene-styrene rubber such as used in auto tires. Countless millions of submicroscopic balls of the rubber are whipped up in the water. When the coat of paint dries by simple evaporation of the water, the rubber balls join in a thin sheet that clings firmly to the wall but lets the dirt slide off it when washed.

Ordinary water-base paints now in use either can't be washed safely or don't get clean when washed.

The new paint can be applied to fresh cement and plaster as soon as they are dry to the touch. Pigments can be added satisfactorily to the new paint, although there are no turpentine, solvents, and oils to cause odors. The rubber paint would be sold in cans ready to apply like other paint and it is more easily manufactured than many other types.

A plastic by-product of the atomic bomb that cannot be dissolved by any known acid, caustic or other solvent was reported to the chemists by a research group from the Oak Ridge atomic energy laboratories. It is known as Fluorothene and it is a war-born fluorine plastic, chemically polychlorotrifluoroethylene. It is being used especially for filters handling highly corrosive and ridioactive materials in the atomic energy program.

Pectin from Sugar Beet

What is left over after the sugar is extracted from the sugar beet is now being used to produce pectin, the substance used to jell puddings, jams, cosmetics and drugs, Prof. P. T. Miller of the University of Wyoming reported. One ton of beets processed for sugar can yield 20 pounds of pectin, which is now obtained chiefly from citrus fruits.

Vitamin B-2 in Bread

Commercial production of riboflavin or vitamin B-2, added to bread because most diets lack it in sufficient quantity, is possible by a new fermentation process reported by chemists of the Department of Agriculture's Northern Regional Research Laboratory, Peoria, Ill. A yeast-like organism called *Ashbya gossypii* is the microscopic chemist that does this job.

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BIOCHEMISTRY

Proteins Differ in Sexes

➤ DARLING, you are growing old. By your amino acids, that is told. And what is more to the chemical point, a woman as she grows older has different amino acid content (protein, in more familiar language) than a man.

This difference between the sexes, explained to the American Chemical Society in Atlantic City, N. J., by a group headed by Dr. Philip G. Ackerman of Washington University School of Medicine, St. Louis, promises to help understand and perhaps treat some of the degenerative diseases in the aged—heart disease, arthritis, etc.

The concentrations of eight of the more essential amino acids, into which protein food is broken down in the human body, were measured in the blood plasma of young and old individuals. In the case of six out of the eight chemicals, the change with age was different in the two sexes.

Although the amino acid pattern has not been related as yet to actual prevalence of disease, it is known that heart disease is more common among men and arthritis is more common among women. This suggests that the degenerative changes of aging may run a somewhat different course in men than in women.

Earlier studies by Dr. Ackerman and his colleagues, Lilli Hofstatter and William B. Kountz, showed that old people have a great need for protein foods, such as meat, eggs and milk. The general belief earlier was that old individuals did not require large amounts of protein, the food that goes to repair and build up muscle tissue, because they are less active and use their muscles less.

"When placed on a very high protein diet a number of our elderly patients showed marked clinical improvement," Dr. Ackerman told the chemists. "They felt better and became more active."

Clue to Cancer Condition

A chemical clue to a cancerous condition of the white blood cells, called myelocytic leukemia, was reported by Drs. Albert A. Dietz and Bernhard Steinberg of the Toledo Hospital Institute of Medical Research. Bone marrow in such cases was found to have an abnormal amount of inorganic sulfate.

Test for Alcohol

An improved method of detecting and measuring the amount of alcohol in the body of those charged with drunken driving was reported by John W. Sease, William H. Harris and Sigmund Jaffe of Wesleyan University, Middletown, Conn. Beverage type of alcohol is converted into gaseous ethyl nitrite which is measured by a color test, while other alcohols do not interfere with the test.

Rutin from Asparagus

Asparagus is a new raw material for producing a compound called rutin that is one of the few hopes of restoring weakened blood capillaries from the effects of radiation from the atomic bomb. A. E. Stevenson of Continental Can Co., Chicago, reported that asparagus too mature for marketing as food has enough rutin content to be a practical source of the chemical, now obtained from buckwheat.

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INVENTION

New Line-Marker Sticks Aid Night Football Games

➤ QUARTERBACKS at night football games will know from a quick sidewise glance what yardage they still have to gain and hence what plays they had better call, if the line-marker sticks invented by Walter J. Fritts of Mount Sterling, Ky., come into general use. For instead of blending dully with a confused background, as even white-painted sticks are apt to do, these new ones will shine like little pillars of fire.

In the Fritts invention, the sticks are made either of slotted aluminum tubing or of transparent plastic. At top and bottom are built-in flashlights, each with its own set of batteries. One set of batteries, the inventor reckons, should last through an ordinary game.

Mr. Fritts has just been granted U. S. patent 2,479,157.

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GENERAL SCIENCE

Police State In Making?

Clearance procedures and restrictions to protect our war secrets may lead us toward laying the foundation for a police state, scientist warns.

➤ THE existence of mechanisms for a sort of industrial police state created in the interests of industrial and military security was evident in the American Chemical Society's discussions of security clearances for scientists in Atlantic City, N. J.

Some of these are:

1. A white list called a central security file of all individuals, organizations, facilities, factories, etc. cleared by all military departments. A corresponding black list of those denied clearance undoubtedly exists in the FBI files.

2. A personnel security board and an industrial employment review board for the armed services which are the bodies that can deny security clearances.

3. Control of all visitors to factories and laboratories doing confidential and secret work for the armed forces.

Col. E. M. Tally of the Munitions Board told the chemists that "the American people are faced with a three-headed monster in providing security in industry for our defense trade secrets." The dangers are failure to protect trade secrets of defense, stifling production and scientific progress by too rigid control, and injury of the innocent.

Restrictions could be made so tight that no foreign agent steals our trade secrets, Col. Tally said, but this would deprive many innocent persons of their jobs and hamper production for defense.

The Army, Navy and Air Force by joint action are attempting to simplify the methods of protecting secret war production so that manufacturers follow the same rules for all government contracts, Col. Tally explained.

Because a large part of American industry is geared to military production in an emergency even if not actually working on secret war material now, some industries and research laboratories are making it the practice to clear all employees, especially scientists, so they can be available to do anything that the company needs done, even if they are hired for non-military work. This puts an increasing number of the scientists under military clearance control.

Even when a scientist or other employee is finally cleared, which is a matter of months of waiting in some cases, he may be subjected to further clearance procedures at the whim of some administrator. Dr. John A Swartout, scientists' representative on the Oak Ridge review board, told the chemists that clearance should erase all doubt about a man's reliability unless there is subsequent action on his part to raise the question of his loyalty.

It became known that wholesale reclearances in the Department of Commerce have been ordered within the past few weeks, affecting even scientists originally cleared before the war and responsible for the creation of some of the most valuable and secret of the military devices and weapons. This is having a disastrous effect upon morale and operation of government scientific research.

Special steps are taken quietly to exclude from government and industrial laboratories many visitors, especially those from abroad, even when they have been invited by international organizations cooperating with official U.S.A. functions. Reports and publications presumably freely available and non-secret are also being withheld from "Iron Curtain" countries when it is known that is there destination.

Extension of the already gigantic government file of detailed information about individuals is feared by Dr. Swartout. A prior police investigation would be required for everyone upon whom public money is spent for education, if there were a logical development of the principle that Congress advocates in requiring clearance of all applicants for Atomic Energy Commission fellowships, Dr. Swartout pointed out. Next in line are the students of state universities and the families of students in our public schools, he suggested.

"The ultimate result is the establishment of the foundation for a police state," Dr. Swartout warned.

Science News Letter, October 1, 1949

PSYCHOLOGY

Ink-Blot Test Forecasts Approach to Research

➤ THE Rorschach test of personality, in which the individual tells what pictures he sees in ink blots, shows how a student will attack a research problem. This is the conclusion of Dr. Lee J. Cronbach, of the University of Illinois, after study of 75 graduate students in education at the University of Chicago.

The thinking habits which show up on the Rorschach test have their parallel in the performance on research, he found. The method of approach, accuracy, and organization on the test corresponds to the treatment of the research problem. And individual assets and limitations in research are forecast in feelings of inadequacy, self-criticism and reaction to authority revealed by the personality test.

Dr. Cronbach reported the results of his studies to the American Psychological Association in Denver, Colo.

Science News Letter, October 1, 1949

CHEMISTRY

Synthetic Rubber Polymer Gives Arctic Weather Tire

➤ A NEW synthetic rubber polymer will make possible automobile tires which will remain in condition for use at temperatures as low as 75 degrees below zero Fahrenheit, the Firestone Tire and Rubber Company of Akron, Ohio, claims.

The amazing resiliency of this new Arctic rubber may enable engineers to solve innumerable problems in the operation of machinery, motor vehicles and aircraft at sub-zero Arctic temperatures, Raymond C. Firestone stated. Rubber tires, hose, gaskets and belting in the past have frozen as hard as rock at temperatures below minus 60 degrees.

Tests under extreme sub-zero laboratory conditions show two outstanding advantages in tires made with the new polymer. They do not stiffen so much that they develop permanent flat spots when parked, and treads do not harden and chip out. Mileage tests in Texas indicate that the rate of wear of this cold weather tire will be satisfactory under normal highway driving conditions.

Science News Letter, October 1, 1949

COLD WEATHER RUBBER—This deep freeze is used to test the resiliency of a new synthetic rubber polymer in tires. The tire is being checked for possible air leakage from a special test valve.

CHEMISTRY-AGRICULTURE

Water-Repellent Soil in Florida Groves Explained

➤ A BAFFLING soil condition of the Florida citrus groves that produces the equivalent of drought despite adequate rainfall has finally been explained.

The water-repellent soil, which "remains dry even after prolonged rainfall," is formed from magnesium used in fertilizer and an undetermined fatty acid in the soil, I. W. Wander of the Citrus Experiment Station, Lake Alfred, Fla., reports in SCIENCE (Sept. 23). Citrus trees growing in this soil are unable to get the water, which they need in moderately large quantities. As a result yields of oranges, lemons, limes and grapefruit fall off considerably, just as they would under drought conditions. Since "water repellency is widespread and quite pronounced in much of the citrus-growing area of Florida," both fruit growers and soil technicians consider it a matter of considerable economic importance.

The magnesium and the fatty acid form an insoluble substance that is almost identical with hard soap made in the laboratory. Soil experts who have not themselves experimentally verified the results advanced by Dr. Wander, find that they accord very satisfactorily with the known facts. They point out, however, that they give rise to an awkward situation. Obviously if magnesium were not used as a fertilizer, the formation of water-repellent soil would not occur. But magnesium is used very deliberately to supply a mineral which the soil lacks and which the fruit trees need. In spite of this, they believe that Dr. Wander's explanation will prove to be the first step in a solution of the problem.

Science News Letter, October 1, 1949

CHEMISTRY

Tungsten Filament in Bulbs Has Its Name Changed

➤ YOU may think that there is a tungsten filament in that incandescent lamp bulb you read by, but you are wrong. It is a wolfram filament.

By international action, the name of the metal and chemical element, tungsten, has been changed to wolfram, by which it has been known generally outside the U.S.A. The symbol already was W.

This is one of six changes from American usage in element names that were made at the International Union of Chemistry meeting held last month at Amsterdam and reported to the American Chemical Society meeting in Atlantic City, N. J.

Niobium replaces columbium, but beryllium is now official for the world instead of glucinium, a European usage. Lutetium is chosen over lutecium and protactinium over proto-actinium. Hafnium is also given approval.

Two elements discovered in atomic fission products have had their names respelled: Technetium for element 43 and promethium for element 61, which were spelled -eum.

Six other elements discovered during atomic bomb research have had the names given them by their American discoverers made official internationally: Astatine for 85, francium for 87, neptunium for 93, plutonium (from which atomic bombs are made) for 94, americium for 95 and curium for 96.

The United States was represented by Dr. Edward Wickers of the National Bureau of Standards on the commission on atomic weights and by Dr. Alexander Silverman of the University of Pittsburgh on the commission on inorganic nomenclature.

Science News Letter, October 1, 1949

OPHTHALMOLOGY

TV Fatigue May Be Boon In Eyesight Protection

➤ TELEVISION fatigue may be a "sight conservation boon," Dr. Benjamin Rones, eye specialist physician of Washington, D. C., declares in the SIGHT-SAVING REVIEW published by the National Society for the Prevention of Blindness.

Serious eye diseases will be discovered earlier, when treatment will give better results, if TV fatigue leads people to seek medical attention earlier, Dr. Rones thinks.

Science News Letter, October 1, 1949

PSYCHOLOGY

"Rock a Bye Baby" May Delight Some, Irk Others

➤ PSYCHOLOGISTS have disagreed about whether you should rock and caress the baby. The baby's side of the argument was presented before the American Psychological Association meeting in Denver, Colo., by Dr. Helen M. Wolfle, of the staff of the Association.

The child does not always want to be petted, Dr. Wolfle told the meeting. But there is little that he can do about it until he is big enough to escape in some way.

At the very earliest ages, he can cry if held too tightly, and he does so. A little later he can try to disengage the hands which are holding him.

But the child finds it difficult to escape until he can run fast, hit hard or use names.

If you insist on cuddling the baby when he is trying to get away, don't be surprised if he bites, hits or kicks you, Dr. Wolfle warns.

If you must pet him, try offering some activity with your caresses such as patting games, tossing, singing, and so on.

And you will find that he will put up with your attentions more readily when he is sleepy.

Science News Letter, October 1, 1949

IN SCIENCE

BIOCHEMISTRY

Green Chemical In Blood Studied

➤ A "BEAUTIFUL green" chemical exists in human blood. It may be involved in stopping the deadly action of poisons such as that from tetanus germs, cause of lockjaw.

The name of the green chemical in blood is verdoperoxidase. It is found in the white cells of the blood which play an important part in the body's defense against germs and their poisons.

Verdoperoxidase, as chemistry students will recognize from the last part of its name, belongs to the class of chemicals known as enzymes. Most familiar enzyme to the layman is the pepsin of the digestive juice.

The green enzyme is one of three known to be in blood cells. Search for more knowledge about the known and unknown but suspected blood enzymes is going on in several laboratories, Dr. Britton Chance of the University of Pennsylvania School of Medicine told a conference on the National Blood Program of the American Red Cross in Washington.

The blood Americans give generously to the Red Cross for this program can be made more useful for saving lives and restoring health when scientists know more about its enzymes.

Science News Letter, October 1, 1949

METEOROLOGY

Rain Has Little Effect On Calming Stormy Sea

➤ RAINDROPS produce only "splash and surface effects" upon the sea, they do not calm it, scientists have found.

E. W. S. Ashton and J. K. O'Sullivan of the engineering department, University of Manchester, Manchester, England, found that from a great height a drop of rain splashes and spreads and thus has little effect in calming a stormy sea.

By dropping aniline dye drops into a glass-side vessel full of water, it was found that the lower the height from which they fall, the more likely they will be to transfer their momentum from the surface layers to the underneath layers.

From 26 feet, however, the drop appears to spread over the surface of the water, thus dissipating its energy. Consequently, the stored-up energy of the individual drop coming from a great height dissipates in shock and splash at the surface, they report in the journal, NATURE (Aug. 20).

Science News Letter, October 1, 1949

NE FIELDS

CHEMISTRY

Make Quartz Crystals That Improve on Nature

➤ QUARTZ crystals better than Mother Earth herself can make have been produced artificially in Bell Telephone Laboratories, the American Chemical Society meeting in Atlantic City was told.

Needed during the war and in peace in order to convert mechanical energy such as sound into electrical energy, essential in many devices including the telephone system, large synthetic quartz crystals will protect the nation against a shortage of natural crystals in case of another war.

The American development is based upon work done by Prof. R. Nacken of the University of Frankfort during the war. The quartz is produced in solid crystalline form from liquid solutions at high temperatures and pressures. The method used is much like the growing of rock candy crystals from super-saturated sugar solution, except that the process is carried out at high temperature and pressure in a thick walled steel tube. The liquid used is a strong alkaline solution which dissolves silica, the compound of which quartz is composed.

The artificially grown quartz is clearer and freer from imperfections which are always found in natural quartz. Growth rates as much as a tenth of an inch in length during the day are possible.

Science News Letter, October 1, 1949

ENGINEERING

New Magnetic Tape Records Data in Flying Rockets

➤ A MAGNETIC metal tape six inches wide and 150 feet long, for installation in the nose of a guided missile to record data as the craft penetrates the atmosphere miles above the earth, was revealed by United Aircraft of East Hartford, Conn. It was developed for the Navy's Bureau of Ordnance.

The recording tape in the device is led into a armored cylinder that withstands the shock of dashing into the ground, in the exhausted rocket, with little or no injury. Conventional paper tapes do not stand the shock. The new magnetic tape recorder may replace methods now in use by means of which automatic radio signals are sent from the missile to the ground because this method requires elaborate ground and air equipment, and difficulties are often encountered in both transmission and reception.

This magnetic recorder weighs only 46 pounds, but is able to record 200 pieces of information simultaneously and continuously on its six-inch tape. Such factors as air pressure, temperature, speed and many others are recorded by electrical signals from a score of instruments. When the record cylinder is recovered after the crash, the steel tape is played back through a transcriber and the information plotted on charts.

The magnetic tape recorder was developed by Armour Research Foundation of the Illinois Institute of Technology, Chicago, on sub-contract to United Aircraft Corporation as part of a guided missile project of the Navy Bureau of Ordnance. The project is cooperative, with the Massachusetts Institute of Technology acting as the technical control group for the associated manufacturers. These are United Aircraft, Bell Aircraft and Bendix Aviation Corporation.

Science News Letter, October 1, 1949

ELECTRONICS

Radio Microwaves Now Used To Measure Molecules

➤ RADIO microwaves, a fraction of an inch long, are being used to find the dimensions of certain molecules in gases and how fast they spin, General Electric scientists revealed in Schenectady, N. Y. The waves used vibrate about 24,000,000 times per second.

The technique used originated in 1933 by two University of Michigan scientists, according to Dr. A. Harry Sharbaugh, but did not become a practical tool until after the war. The recent great advances made in electronic devices for producing and controlling the tiny radio waves is accountable for the present practical development.

The waves are sent through a 16-foot rectangular tube containing the gas under study. Most of the time the radio waves pass through freely, but when they happen to be at one of the characteristic rates of the molecules, they are absorbed, and their energy sets the molecules into increased rotation. A dip in a horizontal green line on the face of a tube similar to that used to receive television pictures, watched by the scientists, shows absorption. Frequency is measured by comparison with a standard.

Dr. Sharbaugh explained that this microwave method of measuring molecules represents an important extension to the science of spectroscopy, used to study laboratory samples or the properties of distant stars. With visible light waves, about 50,000 to the inch, individual atoms can be studied. Infra-red waves, similar to light waves but invisible and longer, can be used in measuring molecules made of groups of atoms. The still longer radio microwaves yield data several thousand times more precise than those obtained with infra-red.

Science News Letter, October 1, 1949

ENGINEERING

Shock-Resistant Electron Tubes Being Developed

➤ RUGGED electron tubes for use in electronic equipment, that will withstand severe conditions of vibration, shock and acceleration, are under development at the National Bureau of Standards in Washington, D. C. Their development is an outgrowth of a project concerned with methods of testing tubes for sturdiness and durability.

Electronic equipment in various kinds of commercial, industrial and military applications is often subjected to severe mechanical abuse. Some tubes may have to withstand great extremes of temperature as well, but in any case the mechanical design of a rugged tube is strictly governed by the required electrical properties.

The first phase of the Bureau's work was a survey of actual operating conditions for electron tubes in various applications. Then came the development of equipment to reproduce the effects of the conditions encountered in use. The Bureau's facilities for testing the ruggedness of electron tubes now include vibration apparatus, mechanical resonance testers, high-impact shock machines, and high-speed centrifuges.

Vibrations produce the most common mechanical stress encountered by electron tubes under severe conditions, I. L. Cherrick of the Bureau staff states. Continuous and intermittent vibrations are present in vehicles, in aircraft, on shipboard and in industrial applications. In motor vehicles the vibrations are usually of low frequency, but in aircraft they may range up to 10,000 cycles per second.

Science News Letter, October 1, 1949

BOTANY

Treeless Prairies Believed Created by Indians

➤ THE treeless prairies, with the grass that supported the great herds of buffalo when the Indians dominated America, were actually made to order by the Indians to suit their way of life.

This new idea that the wild west landscape, as discovered by the white men, was not the natural vegetation of that region was suggested by Dr. Omer C. Stewart of the University of Colorado to the Twenty-ninth International Congress of Americanists held in New York.

The Indians had the habit of burning off the prairies to create fresher pasture for the game they hunted and to keep the country open so that they could see the approach of hostile tribes. Dr. Stewart believes that trees might have grown upon the midwestern plains except for this periodical burning by the pre-Columbian Indians.

Science News Letter, October 1, 1949

CHEMISTRY

Orlon, New Synthetic Yarn

This new treatment of familiar fibers stands up better under sunlight. First commercial production is planned for next year.

By ANN E. EWING

See Front Cover

➤ ORLON, the new synthetic yarn made from natural gas, and oxygen and nitrogen from the atmosphere, will team up next year with such familiar fibers as nylon, rayon, silk and wool for shirts, undergarments, curtains and even men's suits. First commercial production—next year—however, will go largely to industrial users.

Particularly resistant to sunlight, materials of this new fiber lose only about one-fourth of their strength in tests where nylon, silk, wool and rayon fail completely.

Look for Orlon to be outstanding for umbrellas, awnings, sails, convertible tops and other jobs where fabrics must stand up under severe outdoor exposure. Not only sunlight, but moisture, fungus and insects normally will attack these items over a period of time. They will not do so if the articles are made of Orlon.

Orlon approaches nylon in its strength and lightness. In most of its other properties including the final estimated cost, Orlon falls somewhere between nylon and rayon. Unlike nylon, however, which is rather cold and clammy to touch when wet, Orlon has a warm, friendly feeling, either wet or dry.

War Development

Orlon was first developed during the war as a possible product for use in the South Pacific. There other materials, excepting nylon, rotted away in hours or days.

Low specific gravity gives Orlon a high covering and bulking power, permitting the manufacture of lighter weight fabrics than usually obtained. These fabrics, however, have the appearance of appreciably heavier materials.

Orlon will not replace nylon for stockings, underthings and similar uses, although it will be made into woven lingerie, either in white or light pastel shades. This material is known as tricot because of the style in which it is knit. Orlon will supplement rather than compete with nylon in many fields.

The most important industrial uses for this new fiber, which will not be in commercial production until late 1950, are as filter cloths, nets for dyeing nylon hose, marine cordage and as dust filter bags. Orlon will be chosen not only because it is more successful in resisting weathering, but also in resisting alkalis and acids.

Orlon fiber in a continuous filament, that is one long thread, feels like silk. On the other hand, when Orlon is in the form of staple, it feels much like wool.

At first glance, a bit of Orlon staple looks quite like a tuft of cotton. Actually, it is made up of short lengths of thread which have been given a permanent wave.

Some Orlon staple has been made in experimental quantities. Production of a synthetic yarn in staple form is necessary to adapt it to machinery in existing plants.

Crimping gives to the staple the mass cohesion that is essential for good spinning in the wool, worsted and cotton mills now using the traditional fibers. No samples of Orlon staple are yet available, but they are expected after commercial production has started.

Orlon fiber is made from polyacrylonitrile. This is a plastic formed by the polymerization, that is linking together to form long molecules, of acrylonitrile. Acrylonitrile is made from such basic materials as limestone, coal, petroleum, natural gas, water and air.

Acrylonitrile is one of the intermediate products in making a certain kind of synthetic rubber. Known for its resistance to oil, this type became well known during the war as Hycor, Perbunan, Butaprene or Chemigum.

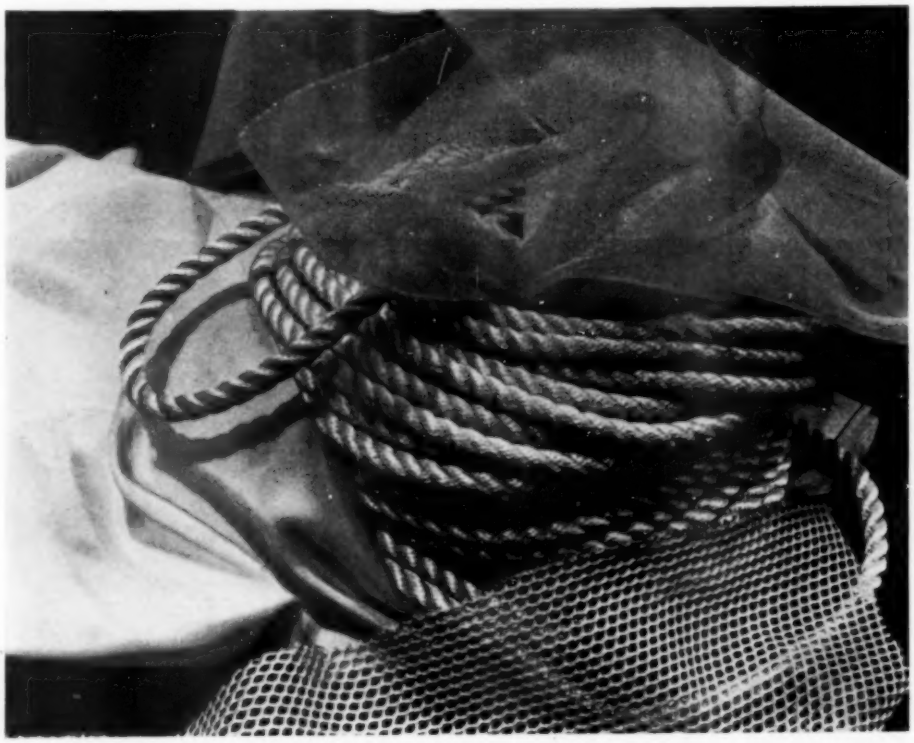
Because the quantity of synthetic rubber made in the United States each year is steadily increasing, the supply of acrylonitrile is ample. It is even possible that the production of Orlon from acrylonitrile will reduce the price of synthetic rubbers.

Making Acrylonitrile

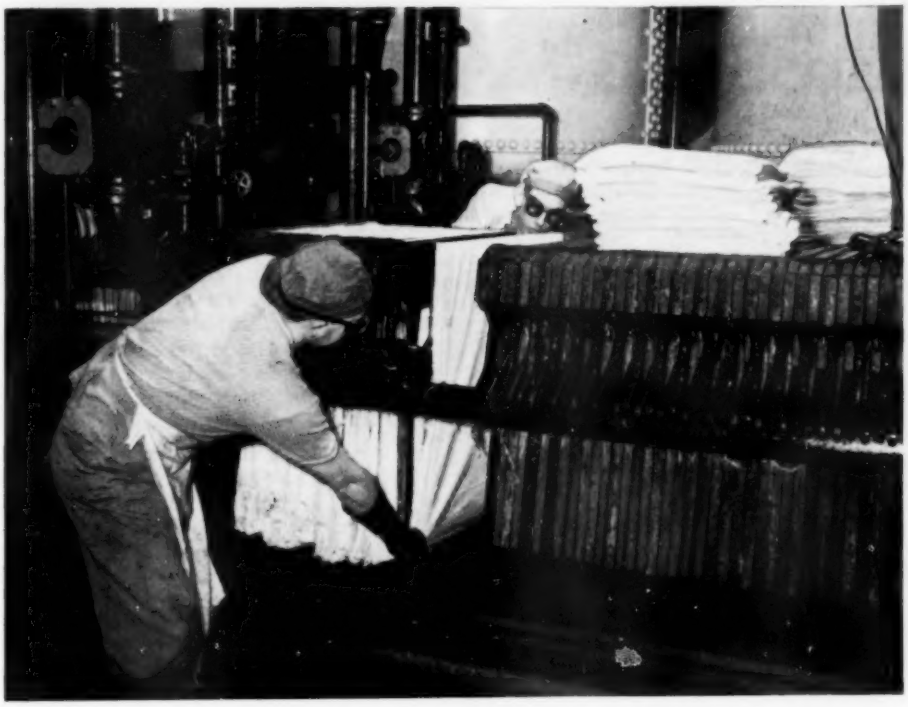
There are several ways to make acrylonitrile. One method is to start with ethylene, which is familiar as an anesthetic and as a compound used to hasten the ripening of fruits and vegetables. By reaction with oxygen from the air and hydrocyanic acid (prussic acid), the ethylene gas is changed into acrylonitrile monomer, which is a fairly volatile liquid.

Under the influence of catalysts, compounds which do not enter into reaction themselves but which help to make the reactions go, the acrylonitrile forms polyacrylonitrile.

Orlon as a fiber is quite similar to the fibers obtained when vinyl chloride, vinyl acetate and vinyl alcohol are polymerized



NEW ORLON PRODUCTS—Fine marquisette for curtains which will not fade in sunlight, weather proof sail cloth, filter cloth, and strong, tough rope are some of the products which can be made of Orlon.



ON THE PRODUCTION LINE—Two men are adjusting the tension on Orlon filter cloths in this picture.

either by themselves or with each other.

Unlike wool, rayon or cotton, the entirely synthetic fibers usually absorb little or no moisture and are nearly as strong when wet as when dry. This property is particularly important in fabrics used outdoors.

Its low moisture absorption also makes Orlon fabrics easier to clean. Dirt does not become imbedded in the fiber and is, therefore, easier to remove.

The problem which now prevents even more widespread experimental use of Orlon is the difficulty of dyeing the fiber. Because it is chemically inert, it does not take too well to ordinary dyes and dyeing methods.

Only Pastel Shades

Orlon can be dyed, but the colors obtained are not too light-fast, and only pastel shades are available at the present time. The chemists at E. I. duPont de Nemours & Company, the company which developed Orlon, believe that by the time full scale production is achieved, the techniques of dyeing this new fabric will have been mastered.

This same difficulty with dyeing was encountered when the only other two all-synthetic fibers now in general use, nylon and Vinyon N, were first produced.

Synthetic fibers account for only one percent of the overall textile uses. Last year over seven billion pounds of fibers were consumed in the United States. Seventy percent of the total textile and cordage products are cotton.

Before considering the use of Orlon as a consumer fabric, the toxic properties of both the polymer from which the yarn is prepared and the yarn itself were thoroughly investigated. They have both been classified as non-hazardous, that is, no dermatitis or skin eruptions developed from the customary patch tests on hundreds of people.

At first, Orlon is expected to make its biggest impression on the curtain industry. It is highly resistant to light, smoke, and soot and gases from industrial plants as well as from heating units in the home itself.

When Orlon is in general use for curtains, the curtain stretcher can be put to good use training climbing rose bushes in the garden. Orlon retains its shape and friendly feel either wet or dry.

Protective work clothing is another field where Orlon is expected to find immediate acceptance. Workers in chemical process industries, rayon plants, garages and gasoline stations are seeking acid-resistant fabrics which will give better protection and safety to the worker and which will last longer. Tests have shown that Orlon answers these needs.

Men's shirts, both business and sports types, should last longer and be more easily washable in the home when made of Orlon, due to the fact that it is quick drying and needs no ironing. Shrinking will be a forgotten thing, since Orlon, like nylon, can be "heat set."

Decorative striping for the pin-stripes in men's woolen and worsted suits are, at the present time, often made of acetate rayon. This fiber, however, has low strength and abrasion resistance. Orlon filament yarns, not colored by dye, would be an interesting substitute for acetate rayon in pin stripes, and would not have these disadvantages.

One of the greatest difficulties in making Orlon fiber was to find a suitable solvent for polyacrylonitrile. Materials now used are organic compounds with such complicated names as dimethyl methoxyacetamide, tetramethylene cyclic sulfone, and meta and para nitrophenols.

The name Orlon as applied to a fiber does not refer merely to a single fiber or yarn but rather to various types of Orlon acrylic fibers. All of these fibers possess many of the properties of the original Orlon but have also distinctive characterizations of their own.

Science News Letter, October 1, 1949

ASTRONOMY

Soviets Discover New Comet, Fifth This Year

➤ SOVIET astronomers bulletined to the world discovery of a new comet at the same time that President Truman announced an atomic explosion in the USSR.

The new comet, fifth this year, was discovered by Dr. P. Shajn of Simeis Observatory in the Crimea. It is too faint to be seen with the naked eye, being thirteenth magnitude, with a short tail.

The discovery was confirmed by Dr. D. J. Martynoff of Kasan Observatory, also in Russia, before it was reported to the Copenhagen clearing house for astronomical news and thence to Harvard Observatory for relaying to American observatories.

First American observation of comet 1949e was by Astronomer Ernest G. Reuning at the U. S. Naval Observatory at Washington Sept. 23.

Located in the constellation of Cetus, the Whale, the comet is high in the night sky near the point where the ecliptic crosses the equator. It is moving slowly south. (On Sept. 24, 5:18.5 GMT, R.A. 5 min. 48.4 sec. Dec. South 2 deg. 7 min. 32 sec.)

Science News Letter, October 1, 1949

SCIENCE FILMSTRIPS

PHYSICS
GENERAL SCIENCE
CHEMISTRY
BIOLOGY
MICROBIOLOGY
ATOMIC ENERGY
LABORATORY SAFETY
HOW TO STUDY
PENCIL SKETCHING

Made by Teachers for Teachers

VISUAL SCIENCES

599-S SUFFERN, N. Y.

MEDICINE

Beta Rays Cause Burns

➤ SEVERE burning of the hands is reported in four men who handled radioactive materials at the recent atomic tests at Eniwetok Atoll.

The damage was due to beta rays, which are composed of electrons, units of electricity. Although the materials they handled also emitted gamma rays which are like light waves or X-rays, there was no body damage beyond the local burns on the hands, a team of doctors at Los Alamos, N. Mex., reported in the JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION (Sept. 24).

The physicians are Norman P. Knowlton, Jr., Edgar Leifer, John R. Hogness, Louis H. Hempelmann, of the Los Alamos Scientific Laboratory, and Drs. Loren F. Blaney, Dan C. Gill, William R. Oakes, and Charles L. Shafer of the Los Alamos Hospital.

The patients, in order to speed their work, had discarded the handling devices provided, it was discovered, and used rubber gloves or bare hands to work the materials. Exposure time in all was from 40 to 60 minutes.

The physicians describe four definite phases which resulted from the burns. In the first phase, the patient had a sensation of tingling and itching of his hand while handling the radioactive materials. This was shortly followed by a reddening and swelling of the hand with blanching of the skin in some areas. In the second phase, there was a period of three to five days when the symptoms decreased. In the third phase, which lasted about three weeks, the reddening of the hands spread and blisters formed. These were painful and required draining. The skin then peeled off and left a new layer of skin which was thin and tight with a shiny appearance. During the fourth phase, which is also the chronic stage of the disease, ulcers formed which would not heal and required grafting of the skin. Also, there was noted wasting and loss of soft tissue in the fingers with loss of power to move the fingers in some cases.

Other effects noted were damaged blood vessels in the burned area, retarded growth of nails, loss of hair on the back of the fingers and a stoppage of perspiration in the palms.

Treatment consisted of ice packs to cool the hands, cutting out the unhealed areas and skin grafting. Besides this, the patients were given rutin, for strengthening the walls of blood vessels, a high protein diet, several necessary vitamins and penicillin to check further infection.

The physicians point out that these patients had just entered the fourth stage of the disease and their progress would have to be followed for a few years. The danger they fear is that some malignant changes may occur.

"It is hoped," they state, "that by calling attention to the early signs and symptoms of injury by beta radiation, overexposure will be recognized and hazardous operations discontinued before more damage is incurred."

Science News Letter, October 1, 1949

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MEDICINE

Report Method for Finding Early Inaccessible Cancer

➤ A METHOD for detecting cancer of certain organs playing an important role in digestion and the secretion of body juices before it reaches the hopeless stage is reported by Drs. Henry M. Lemon and Walter W. Byrnes of the Boston University School of Medicine and Boston City Hospital.

Each year about 10,000 people die of cancer of the liver, the bile ducts leading from the liver and the pancreas. Although cancer in these areas accounts for only 5% to 10% of all cancers, the death toll is high because this region is hard to get to, the physicians declared in the JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION (Sept. 24).

They suggest that at the first sign of upper abdominal pain or jaundice the following technique should be followed: A tube be inserted down into the duodenum, which is the first part of the small intestine, and the fluid removed by suction. After the fluid has settled, the cells obtained from it are smeared on slides and stained. Cells which are characteristic of cancers can thus be identified because they usually show more and larger nuclei to the protoplasm than in normal cells.

Drs. Lemon and Byrnes do point out that it is not possible to identify the origin or type of cancer by this method. But they were able to diagnose cancer in patients who came ill to the hospital which was confirmed when the patients died. In their experience, the patients they diagnosed had come too late for treatment.

This study was supported in part by a grant from the U. S. Public Health Service.

Science News Letter, October 1, 1949

GENERAL SCIENCE

Giveaways to New Babies Hit by Hospital Bureau

➤ GIVEAWAYS are now slapped down by a hospital organization. The giveaways in this case are being operated not over the radio but through hospital staffs as a "service" to mothers who receive a gift package of baby items while still in the hospital.

This promotion scheme puts the hospital in the position of "endorsing several commercial products which may or may not have real merit," declares the Hospital Bureau of Standards and Supplies in New York.

Advantages to the manufacturer are having his product sampled and getting weekly lists of the families supplied including the babies' first names for personalized direct mail pieces.

The scheme will "lower the professional standing of hospitals in their communities," the Bureau warns its members.

Now in operation in New York, covering 53 hospitals and 52% of the births, the scheme will be in Philadelphia next, then in Baltimore, Boston, Chicago, Pittsburgh, Cleveland and Cincinnati.

The Hospital Bureau is a non-profit, cooperative buying organization operated by and for voluntary hospitals.

Science News Letter, October 1, 1949

The so-called *"enrichment" of flour*, required during the war and now still widely followed, means the addition of very small quantities of iron and the synthetic vitamins, niacin, thiamine and riboflavin.

MEDICINE

Hunt Mice To Aid Cancer

➤ A WILD mouse hunt, to aid the fight against cancer, will soon be on in cities and villages all over the nation. The mouse hunters will be the quarter of a million high school boys and girls who are members of Science Clubs of America, sponsored by Science Service.

When they have found the mice, the high school students will breed and study them in cooperative research with the Roscoe B. Jackson Memorial Laboratory, Bar Harbor, Me., world famous center of cancer study and mouse breeding for scientific research.

The wild mouse research project will contribute directly and importantly to the discovery of new scientific facts about cancer, Dr. Clarence C. Little, Jackson Laboratory director, declared.

The project is being organized by Dr. Little, Watson Davis, director of Science Service, and Dr. Elizabeth Russell, who is in charge of Jackson Laboratory's inbred strains of mice that are the backbone of scientific and medical research throughout the country.

This new pioneer project should prove both exciting and fruitful, judging from experiences with previous cooperative projects the young people in Science Clubs have carried on with the U. S. Weather Bureau and other national institutions.

"The students," Mr. Davis said, "will have fun doing it and at the same time will be learning actual techniques that will prepare them for work as research scientists in later life. They will have the satisfaction of making a positive contribution of lasting value to science."

The grasshopper mouse, the red backed mouse (a forest type), the jumping mouse, the harvest mouse and the lemming mouse are among the 13 genera the high school boys and girls will hunt. None of them has been of any use to man and ordinarily they are considered pests. Information about cancer in them is practically unknown to the scientific world.

"This search for new animal material," Dr. Little said, "will constitute the first cooperative attack between a scientific research laboratory and high school students on problems of cancer research."

"The work being undertaken is not being duplicated anywhere," he explained. "The students will not be engaged in routine confirmation of known facts but in actual exploration into a field not now covered."

The Jackson Laboratory will provide instructions for trapping, information on food and life habits, data on recognition of interesting variations in form and color, as well as directions on how to recognize external cancer in living specimens or to diagnose it at autopsy.

The students will not be in any danger of getting cancer as a result of taking part in the project. Dr. Little emphasized that the project is absolutely safe, provided instructions are followed.

The project is open to any member group of Science Clubs of America. Groups of students not affiliated but wishing to take part, may get complete details about joining at no cost by writing to Science Clubs of America, 1719 N St., N. W., Washington 6, D. C.

Science News Letter, October 1, 1949

ENGINEERING

Portable Transformer Stand-In for Damaged Ones

➤ A PORTABLE transformer of high capacity is to be available for temporary use at sites where needed in Portland, Ore., and at Seattle. It will be kept mounted on a railroad car, ready for immediate transfer to a point where a permanent transformer is in need of repair.

This transformer, a device to cut high voltage to the strengths more ordinarily used in distribution lines, will be constructed by Westinghouse Electric Corporation and is for use of the U. S. Bonneville Power Administration. It will take a current of 230,000 volts and cut it to 115,000 or 57,000 and 13,200 volts, and will be ready for delivery in 1951.

Science News Letter, October 1, 1949

Words in Science— FROST-RIME

➤ FROST and rime are both feathery, white formations on objects in the winter landscapes. But they are not the same thing.

Frost forms when moisture in the air passes directly from the gaseous to the solid state and forms ice crystals on a cold surface. It is not frozen dew, which is moisture that has condensed into liquid on contact with a cool surface. The frost does not pass through the liquid state at all but forms ice directly. The same process that causes dew and frost causes the "sweating" of ice water glasses on a hot summer day.

Rime is formed from freezing fog or mist and is deposited on the windward side of objects. Rime may form either by day or by night.

Science News Letter, October 1, 1949

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By H. T. Pledge

Librarian, Science Museum of London

"A thorough-going history of science. The author takes the subject and the reader in his stride on a journey which must be ranked as a very able performance, indeed. The illustrations are excellent, the bibliography is unusually helpfully arranged, and the indices are full and satisfactory."—The N. Y. Times

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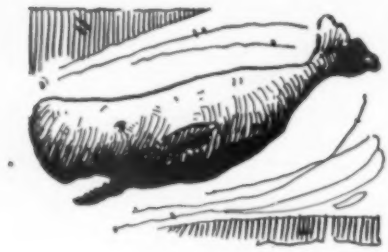
BIOLOGY

NATURE RAMBLINGS

by Frank Thone



Unseen but Important

➤ ISN'T it odd, how all animal life in the sea is dependent on tiny plants invisible to the naked eye!

Vast mountains of these algal cells are accounted for in the more usual cycles of eat-and-be-eaten represented by practically all fish, crustaceans, dolphins, seals, whales, as well as less familiar creatures such as jellyfish, starfish and sea urchins, octopuses and cuttlefish—all the larger carnivora and scavengers that swim the sea and crawl on its bottom.

Each of these creatures eats other animals a little smaller than itself. These in turn prey on still others that are a step smaller, until at last we get down to the ultimate feeders on the one-cell algae—animals that are microscopic themselves. There may be a dozen or a score of digestive steps between diatom and whale.

That pyramiding of hungers holds true specifically for the sperm whales, the only whales that eat really large bites. With their enormous jaws and stumpy teeth as big as pint jars, sperm whales rend and devour the pink flesh of the giant cuttlefish that live in the great dark depths. These cuttlefish are in turn devourers of anything they can touch with their anaconda-like arms, including many really large fish. The big fish in turn are eaters of smaller fish, and the smaller fish feed on still smaller ones. The smallest fish eat tiny shrimp-like creatures, marine worms, swimming mollusks, and so on. These, finally, make the ultimate food-demand upon the one-celled algae, the humble grasses of the sea.

Whales, partly because of their huge size, partly because of the mystery that still surrounds much of their lives, give dramatic emphasis to the struggle for food, the compounded tragedy of eat-and-be-eaten that goes on incessantly in the sea. But it must be remembered that on smaller scale it is repeated in the life of every fish down to the smallest minnow, every squid and cuttlefish, every oyster and clam, every sea animal that eats other sea animals.

Hence the anxious preoccupation of sea scientists with the microscopic algae. With all the care and ingenuity that agronomists bestow on questions of soil fertility, rainfall, growing temperatures, and all other factors that make for success or failure in the production of land crops and pastures, the oceanographers study the conditions that influence the lives of these humble plants that are the foundation of whatever men take out of the sea with hooks, or nets, or harpoons.

(Reprint from SNL, Sept. 14, 1940)

PHYSICS-MATHEMATICS

Earth's Magnetic Field

➤ THE gravity pull of the earth as it spins on its axis may be what gives the earth its magnetic field and makes compasses point to the north.

This simple explanation for one of the baffling and important problems of modern science is given by Dr. Antonio Giao of Lisbon, Portugal, in the scientific journal, PHYSICAL REVIEW.

The new explanation of the earth's magnetism is based on Dr. Giao's "unified field theory." Scientists following this explanation do not need to assume that the core of the earth is a giant magnet or that the ionosphere and atmosphere have impossibly great circulating electric currents.

Beginning with a study of the natural geometry of our familiar three-dimensional space plus time, and by wrapping another fifth dimensional space around it, Dr. Giao finds that the gravitational effects explained by Einstein have a close parallel in the electrical effects of the new geometry and that the two are necessarily closely related.

Behind the complexities of Dr. Giao's mathematics is the fact that the familiar effects of gravity are due to the curvatures of our space-time as seen from within our universe. But electric and magnetic effects come from curvatures that can only be appreciated by a mathematician or by some five-dimensional being looking at us from outside of our universe.

The magnetic fields of the earth, sun, stars and the neutron all receive a direct explanation by the new theory. In the case of the earth, assumed to be a rotating mass containing no permanent magnets, the magnetic field that points compasses to the north appears as a natural consequence of the rotation. In addition, there appears at the same time an apparent electric charge on the earth.

In the case of some massive rotating stars, Dr. Giao surmises, this electric charge of the star might become great enough to make the star into a giant particle accelerator or "atom smasher" which can throw atomic fragments out into space with the great energies of cosmic rays.

Those stars with the peculiar variable magnetic fields recently observed are explained by the theory, as well as the more familiar Coulomb electrical forces well-known to physics students.

Science News Letter, October 1, 1949

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BIBLIOGRAPHY ON PRESTRESSING AND PRECASTING REINFORCED CONCRETE FOR USE IN HIGHWAY BRIDGES AND STRUCTURES—Bridge Department, California Division of Highways—*Highway Research Board*, 110 p. illus., paper, 75 cents.

CHILDREN WITH MENTAL AND PHYSICAL HANDICAPS—J. E. Wallace Wallin—*Prentice-Hall*, 549 p., illus., $6.65. A reference book for professional workers in fields of special education, child guidance, pediatrics, etc. Based on first-hand experience in the treatment of the handicapped.

CONDITIONED REFLEX THERAPY: The Direct Approach to the Reconstruction of Personality—Andrew Salter—*Creative Age Press*, 359 p., $3.75. Presenting a method of psychotherapy which the author believes will supersede psychoanalysis. He sees hypnosis as a form of conditioning.

DESIGN OF AN ULTRAVIOLET ANALYZER—Gilbert Kivenson, J. J. Osmar, and E. W. Jones—*Mellon Institute*, 5 p., illus., paper, free upon request to publisher, University of Pittsburgh, Pittsburgh 13, Pa.

FARMER VICTORIOUS: Money, Mart and Mother Earth—William J. Hale—*Coward-McCann*, 241 p., $3.00. On the anticipated effects of chemurgy on society.

THE FEMALE EXTERNAL GENITALIA OF THE SPOTTED HYENA—D. Dwight Davis and H. Elizabeth Story—*Chicago Natural History Museum*, 7 p., illus., paper, 15 cents. Description and illustration of the unusual organs of the female hyena which in young animals are strikingly similar to the males.

IMPROVING POULTRY THROUGH THE NATIONAL POULTRY IMPROVEMENT PLAN—Paul B. Zumbro, Melvin W. Buster, and J. D. Sykes—*Govt. Printing Office*, 18 p., illus., paper, 10 cents.

INFORMATION FOR AMERICAN BUSINESSMEN ON THE MARSHALL PLAN—*Office of Information, Economic Cooperation Administration*, 30 p., illus., paper, free upon request to publisher, Washington 25, D. C.

LET'S GO TO THE DESERT—Harriet E. Huntington—*Doubleday*, 90 p., illus., $2.50. A charming book of photographs showing the beauties and interesting creatures of the desert. One of a series of books for children.

LIVE WITH LIGHTNING—Mitchell Wilson—*Little, Brown*, 404 p., $3.00. A novel pointing out the non-scientific problems in the life of a young scientist in this modern age.

MEMORIES OF EIGHTY YEARS—James B. Herrick—*University of Chicago Press*, 270 p., illus., $5.00. The autobiography of a noted physician.

MODERN COLLEGE GEOMETRY—David R. Davis—*Addison-Wesley*, 238 p., $4.50. For prospective teachers of mathematics.

NOTES ON SOME VERACRUZ BIRDS—Melvin A. Traylor, Jr.—*Chicago Natural History Museum*, 7 p., paper, 10 cents. Notes made by the author in the course of identification of a collection of birds made in Mexico.

PHYSIOLOGY IN DISEASES OF THE HEART AND LUNGS—Mark D. Altschule—*Harvard*, 368 p., $5.00. For third and fourth year medical students.

THE PLANT ALKALOIDS—Thomas Anderson Henry—*Blakiston*, 4th ed., 804 p., $14.00. The chemistry of these important drug plants and also their physiological action.

POLLEN-SLIDE STUDIES—Grafton Tyler Brown—*Thomas*, 122 p., illus., $6.00. If you are one of the army of hayfever sufferers, you will be interested in seeing such a lifelike portrait of your particular enemy as is portrayed here. This book is intended to enable any allergist or technician to identify and count the important pollen grains and fungus spores in the air.

POPULAR MECHANICS MONEY-MAKING HOBBIES: A Collection of Articles on Basic and Advanced Methods in Home Arts and Crafts Which Combine Profits With Fun—*Popular Mechanics Magazine*, 158 p., illus., $2.00. A how-to-make-it book requiring the use of only simple tools.

PRESERVING BIRDS FOR STUDY—Emmet R. Blake—*Chicago Natural History Museum*, 38 p., illus., paper, 30 cents. A simply and clearly prepared handbook telling how to prepare birds for the museum.

PRINCIPLES OF FIELD CROP PRODUCTION—John H. Martin and Warren H. Leonard—*Macmillan*, 1176 p., illus., $6.00. A college text for agricultural students.

PRINCIPLES OF ORGANIC CHEMISTRY—John Leo Abernethy—*Saunders*, 317 p., $4.00. A textbook for the beginning student.

QUANTITATIVE CHEMICAL ANALYSIS—George L. Clark, Leonard K. Nash, and Robert B. Fischer—*Saunders*, 448 p., illus., $4.25. An introductory text for chemical and non-chemical students, including pre-medical, home economics, agricultural and engineering students.

REPORT TO THE UNITED NATIONS—*United Nations Educational Scientific and Cultural Organization* (Columbia University Press), 176 p., paper, 80 cents, An annual report of the activities and programs of UNESCO.

REPORTS OF COMMITTEE ON ROADSIDE DEVELOPMENT AND SPECIAL PAPERS—*Highway Research Board*, 154 p., illus., paper, $1.50. Telling how to make the roadside beautiful, prevent erosion, and so on.

ROSE'S LABORATORY HANDBOOK FOR DIETETICS—Revised and Rewritten by Clara Mae Taylor and Grace MacLeod—*Macmillan*, 5th ed., 358 p., $5.00. A text and reference work for hospital dietitian and community and public health nutritionist.

SAFETY THRU ELEMENTARY SCIENCE—*National Commission on Safety Education and National Science Teachers Association*, 40 p. illus., paper, 50 cents. What young boys and girls should know for the safe use of their toys and other equipment in home and school.

SCIENCE AND THE MORAL LIFE—Max C. Otto—*New American Library*, 192 p., paper, 35 cents. A philosophical work consisting of selections from the writings of a philosopher of the Midwest.

THE SCIENCE OF CULTURE: A Study of Man and Civilization—Leslie A. White—*Farrar Straus*, 444 p., illus., $6.00. A professor of anthropology at the University of Michigan views man and the world in which he lives, describing his views as "culturology."

SOME LOWER HURONIAN STROMATOLITES OF NORTHERN MICHIGAN—Eugene S. Richardson, Jr.—*Chicago Natural History Museum*, 15 p., illus., paper, 30 cents.

STANDARDS AND LABELS FOR CONSUMERS' GOODS—Jessie V. Coles—*Ronald*, 556 p., illus., $5.00. What to look for when you go shopping.

STATE PLANNING AND ECONOMIC DEVELOPMENT IN THE SOUTH—Albert Lepawsky—*National Planning Association*, 193 p., $3.00. A Report of the NPA Committee of the South.

THE SUPERVISOR'S MANAGEMENT GUIDE: For All Who Supervise Others—M. Joseph Dooher and Vivienne Marquis, Eds.—*American Management Association*, 190 p., paper, ring binder, $3.50. A human relations guide for foremen and supervisors dealing with such topics as morale, absenteeism and leadership. Contains a self-analysis quiz.

TESTING MILK AND CREAM—Philip A Wright—*Govt. Printing Office*, 46 p., illus. paper, 15 cents. A guide to dairy-plant operators.

UNIVERSITY PHYSICS: Complete Edition—Francis Weston Sears and Mark W. Zemansky—*Addison-Wesley*, 848 p., illus., $6.00. For students of science and engineering for whom calculus is still a new tool.

Science News Letter, October 1, 1949

HOME ECONOMICS

Frozen Drink Tastes Like Fresh, Juicy Apples

➤ AN apple drink, tasting not like cider but like fresh apples, has been developed by Dr. W. V. Cruess of the University of California, Berkeley, Calif.

Similar to the orange, lemon and grape juice concentrates now available, the frozen apple juice will be made cold and fresh at home by mixing three cans of water with one of the concentrate.

Science News Letter, October 1, 1949

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WRIST CAMERA straps on the wrist like a watch and uses either black and white or colored film. Called the first domestic magazine load miniature camera, it is made of lightweight plastic. Accessories include viewer, wrist band, case, and 14 frames of 16-mm. film.

Science News Letter, October 1, 1949

BONDING SOLUTION, for mounting photographs, withstands such severe tests as soaking in water for two days and long exposure to the heat of the sun. It is based on Vinylite resin, and contains nothing that will have any ill effect upon any photographic paper.

Science News Letter, October 1, 1949

PORTABLE, 50-pound, electric power supply unit, which provides a well-regulated source of direct current at loads from 200 to 300 milliamperes, is suitable for laboratory, broadcast, and industrial applications. Optional carrying cases have been designed for the television trade.

Science News Letter, October 1, 1949

TROUSERS for winter wear have cuffs, recently patented, which bulge out over the ankles but are strapped to the leg above and below. Each cuff is made of four hexagonal pieces, with side seams aligned with the side seams and the notches of the trouser legs.

Science News Letter, October 1, 1949

GERMANIUM crystal mixer, for use in miniaturization in radio circuits, is shown in the picture where it is contrasted in size with more ordinary mixer tubes, including one of standard and one of subminiature types. It is a four-terminal type.

Science News Letter, October 1, 1949

WINDOW BALANCE, recently patented, is a friction device to take the place of the common weight balances in a window sash, and can be used in old or new construction. It consists of a plate with an adjustable side spring which can be fixed over the rope groove in the edge of the sash.

Science News Letter, October 1, 1949

THREE-SPEED fishing reel, suitable for almost all salt-water fishing reels, has a gear shifting unit which gives no interference to free-spool or star-drag operations. The combination of speeds desired can be obtained by proper assembly before starting for fishing.

Science News Letter, October 1, 1949

FROZEN COFFEE concentrate, in five-ounce cans, will soon be available on the market. It will provide housewives with hot coffee at about five cents a cup. It is a product of the company responsible for the nation's first fully automatic hot coffee vending machine.

Science News Letter, October 1, 1949

ADVERTISING attachment, a small aluminum frame with an enamel finish and a glass front and rear, is easily fixed in place on the top of the parking meters now common on city streets. Advertising cards are inserted between the glass plates, bringing additional income to the city.

Science News Letter, October 1, 1949

Do You Know?

European silk is produced largely in Italy.

Alaskan *fur-seals* live in "rookeries," with 35 to 40 females under the domination of one old bull.

Carrots actually build up their supply of the valued food element, *carotene*, during winter storage.

No single *adhesive* has been developed that will satisfactorily bond all types of materials.

The twin cities, Fort Williams and Port Arthur on the north shore of Lake Superior, are together called the *grain-shipping capital* of the world.

The "non-farm use" of *fertilizer* in the United States amounts to about 240,000 tons; its applications are on lawns, home gardens, golf courses, cemeteries and city parks.

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